

## HYDROPTILIDAE (TRICHOPTERA) OF COSTA RICA: THE GENUS *MAYATRICHIA* MOSELY

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*Abstract.*—The genus *Mayatrichia* is represented in Costa Rica by three species, *M. ayama* Mosely, *M. rualda* Mosely, and *M. illobia*, new species. The new species, also known from Ecuador, is described and illustrated. Distribution records, maps, and a key are provided for known Costa Rican species of *Mayatrichia*.

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Comprehensive faunistic surveys of Trichoptera have been conducted in much of the Holarctic region, but such surveys have been infrequent in the Neotropics. Through the efforts of O. S. Flint, Jr., Smithsonian Institution, faunal lists have been prepared for the Antillean islands of Puerto Rico (1964), Jamaica (1968a), and Dominica (1968b). Several European workers, notably L. Botosaneanu, Institute of Taxonomic Zoology, Amsterdam, have studied the fauna of Cuba (Botosaneanu, 1979; Kuman-ski, 1987). The caddisfly fauna of Mexico is being surveyed by J. Bueno-Soria, Universidad Nacional Autónoma de México, and his students (Bueno-Soria and Flint, 1978). In South America, pioneering work by Flint has produced faunal lists for Surinam (Flint, 1974a) and Chile (Flint, 1974b) as well as species descriptions and keys for more restricted watersheds (e.g., Flint, 1981). In 1986, Holzenthal began the first extensive survey of the caddisfly fauna of Costa Rica. To date, almost six months of field research in Costa Rica has resulted in an initial checklist (Holzenthal, 1988) and thousands of specimens from over 100 separate collections at 90 different localities throughout the country.

Costa Rica, although small in area, is rich in physiographic diversity, with a series of large central mountain ranges and 19 Holdridge life zones, including transitional provinces (Tosi, 1969). The combination of Costa Rica's very dissected topography and high rainfall make for a diverse array of aquatic habitats. The caddisfly fauna of Costa Rica is reflective of this physiographic diversity and apparently has the quality of most tropical biotas in that it is speciose and contains a high proportion of endemics. Of the approximately 400 caddisfly species now known from Costa Rica, more than half appear to be endemic. Unfortunately, as is the case in much of the Neotropics, intensive land development is irreparably affecting entire Costa Rican watersheds; few of the country's drainage basins can be considered virgin. The Costa Rican caddisfly inventory is providing information about aquatic insect faunas for watershed conservation and management programs and against which future changes to particular watersheds can be compared.

This paper marks the initiation of a series of papers dealing with Costa Rican Hydroptilidae, or microcaddisflies. The Hydroptilidae, although one of the most

speciose trichopteran families, is little known for much of the Neotropics, including Costa Rica. Because of the small size of microcaddisflies, adults are generally 2–5 mm in total length, they are often neglected by collectors and inadequately described. Of the approximate 250 described Neotropical Hydroptilidae, less than 30 have been recorded from Costa Rica previously. Certainly, these totals represent a small percentage of the actual Neotropical and Costa Rican hydroptilid fauna. In fact, since the initiation of the Costa Rican caddisfly inventory, we have collected and identified 125 Costa Rican microcaddisfly species of which 74 are new to science, including at least two new genera. With this work on the genus *Mayatrichia* Mosely, we begin a synopsis of the hydroptilids of Costa Rica. Additional, ongoing collecting will add both new distribution records and undescribed species, but we feel these additions will be relatively minimal and can be treated in a planned summary paper dealing with an overview of the entire Costa Rican microcaddisfly fauna. We prefer to make these names available now, in part to alert scientists, especially conservationists, to the diversity of Costa Rica's microcaddisflies.

Terminology in this and subsequent papers will follow that presented by Marshall (1979) and her paper should be consulted for an overview of the family. New taxa described in our series may challenge aspects of Marshall's phylogenetic hypotheses and our reinterpretations will be treated where appropriate. Type material will be deposited at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH), the Instituto Nacional de Biodiversidad, Costa Rica (INBIO), and the University of Minnesota Insect Collection, St. Paul (UMSP). All specimens of previously described species upon which new records are based are from UMSP, except where indicated.

### *Mayatrichia* Mosely

*Mayatrichia* Mosely 1937:182. Type species: *Mayatrichia ayama*, by original designation.

The New World genus *Mayatrichia* contains six previously described species: *M. acuna* Ross 1944 from Texas and Utah, *M. aliena* Kumanski 1987 from Cuba, *M. ayama* Mosely 1937 widespread in North America east of the western continental divide south to Costa Rica, *M. moselyi* Blickle and Denning 1977 from Utah, *M. ponta* Ross 1944 from Oklahoma, and *M. rualda* Mosely 1937 from Mexico and Costa Rica. Ross (1944) provided a key to males of *M. ayama*, *M. ponta*, and *M. acuna*. *Mayatrichia ayama* and *M. rualda* were recorded from Costa Rica by Bueno and Flint, 1978. The Cuban species, *M. aliena*, was tentatively assigned to the genus, but it is probably not congeneric (Kumanski, 1987). We here describe an additional Neotropical species from Costa Rica and Ecuador and provide additional distribution records for *M. ayama* and *M. rualda* in Costa Rica.

*Mayatrichia* adults can be recognized by having 0-2-4 tibial spur formula, presence of ocelli, and triangular metascutellum (Blickle, 1979). Diagnostic features of the male genitalia are the prominent posterolateral processes of segment IX, the broad inferior appendages, and the tubular phallus (Marshall, 1979). Females have simple, tubular genitalia, with a prominent bursa copulatrix. Wiggins (1977) provided a detailed description of the larva and case of *M. ponta* and Ross (1944) provided the same for *M. ayama*. In North America, larvae are found on rocks in rapid stretches of often large streams and rivers where they apparently feed on fine organic material

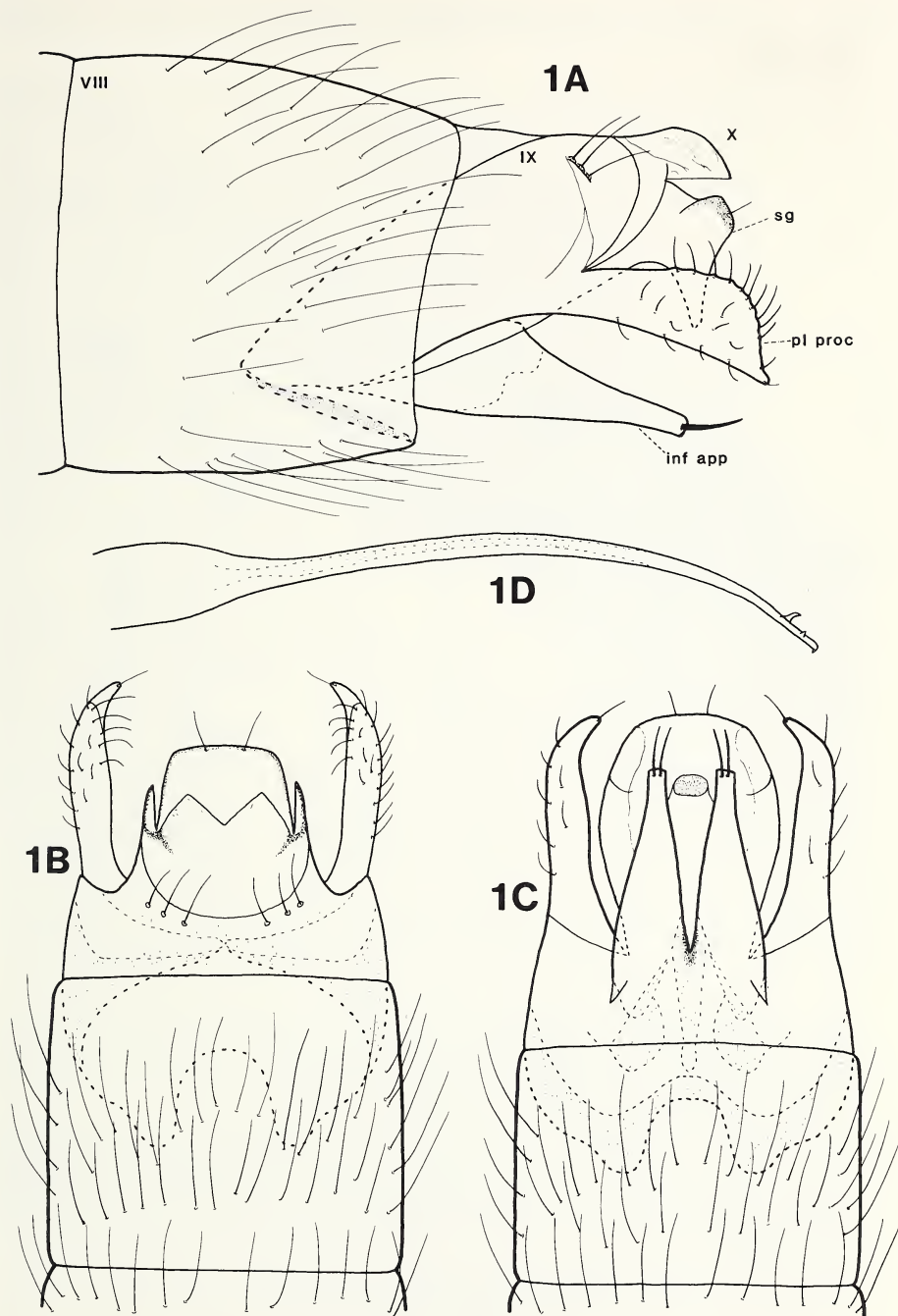
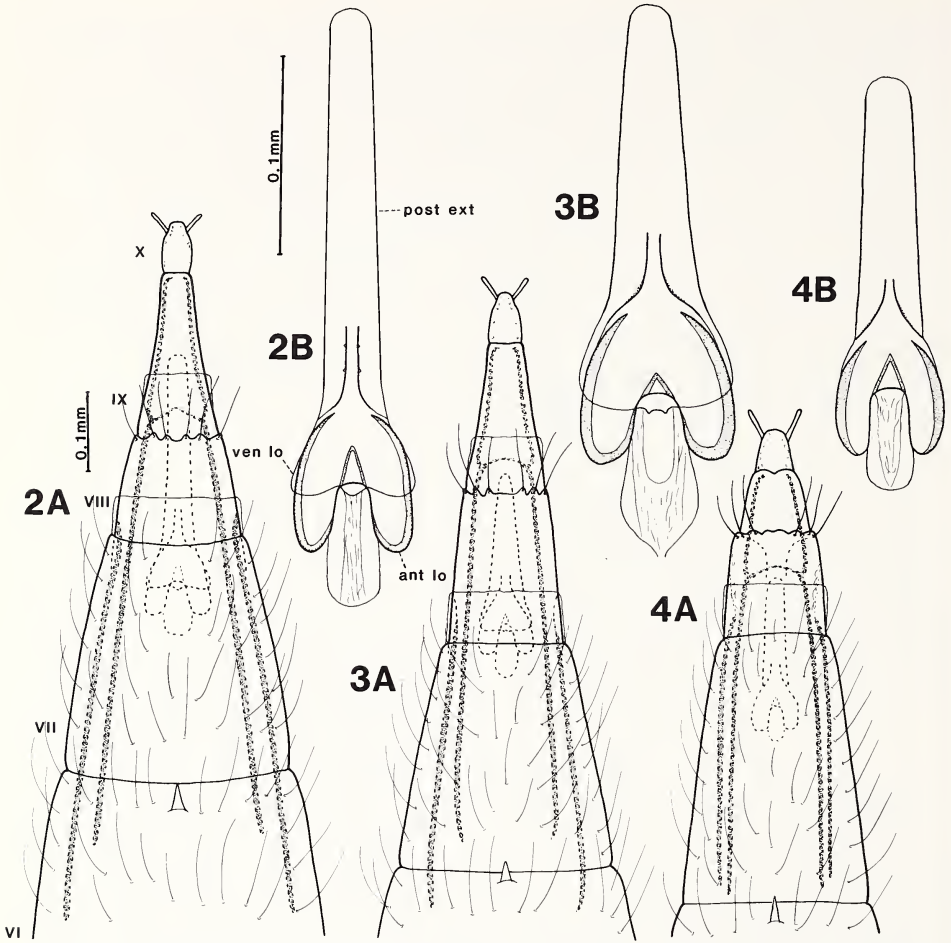


Fig. 1. *Mayatrichia illobia*, n. sp., male genitalia: A, lateral; B, dorsal; C, ventral; D, phallus, lateral. Abbreviations: VIII, IX, X = abdominal segments VIII, IX, X, respectively; sg = subgenital plate; pl proc = posterolateral process of abdominal segment IX; inf app = inferior appendage.



Figs. 2-4. *Mayatrichia* spp. female genitalia: A, terminal abdominal segments, ventral; B, bursa copulatrix, ventral. 2, *M. rualda*. 3, *M. ayama*. 4, *M. illobia*. Abbreviations: VI-X = abdominal segments VI-X, respectively; ven lo, ant lo, post ext = ventral lobe, anterior lobe, and posterior extension, respectively, of bursa copulatrix. Scale = 0.1 mm.

(Wiggins, 1977). In Costa Rica, adults were collected alongside medium-sized, moderately flowing, midelevation streams (e.g., Río Singrí, Río Guineal) as well as lower elevation, slower flowing, more turbid streams and rivers (e.g., Río Ceibo, Río Puerto Viejo) (Fig. 5).

#### *Mayatrichia illobia*, new species

Figs. 1, 4, 5

*Diagnosis.* In overall appearance, this species appears most similar to *M. rualda*. Both species have the inferior appendages tapering in ventral aspect and bearing 2



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Fig. 5. Distribution of *Mayatrachia illobia*, n. sp., *M. ayama* Mosely, and *M. rualda* Mosely in Costa Rica.

terminal setae, but in the new species these appendages lack a basodorsal lobe. Also, the posterolateral processes of segment IX of *M. illobia* lack a pronounced postero-ventral lobe. Finally, the phallus of *M. illobia* has a conspicuous subapical spine-like projection at its apex, not seen in *M. rualda*. The female can be distinguished by the absence of a ventral lobe on the bursa copulatrix.

Male. Length 2.1–2.4 mm. Color brown in alcohol. Antennae 18 segmented. Sternum VI with short posteromesal process. Segment IX annular; with narrow posterolateral processes, in lateral view, each with ventral margin straight, entire, dorsal margin rounded; segment IX with numerous folds and ridges dorsolaterally; in dorsal view, tergum IX emarginate on posterior margin with group of three setae laterally, anterior margin with deep mesal incision. Tergum X membranous, hood-like in lateral view; in dorsal view with posteromesal incision. Inferior appendages tapering distally in both lateral and ventral views, apices bearing two stout setae; basodorsal process absent. Subgenital plate with posteromesal process directed ventrally; in

ventral aspect oblong, with membranous folds laterally, bearing pair of setae on posteromesal margin. Phallus long and narrow, apex with two small apical spine-like projections, and long subapical dorsal spine.

Female. Length 2.0–2.8 mm. Antennae 18 segmented. Similar in color and appearance to male. Sternum VI with short posteromesal process. Segment VIII with posterior margin ringed with stout setae; internally bearing two pairs of lateral sclerotized rods, inner pair connecting with lateral rods of segment IX and extending to end of segment VII, outer pair originating near anterior margin of segment VIII and extending to tips of inner rods. Segment IX with posterior margin slightly emarginate; internally bearing pair of lateral rods extending to middle of segment VIII. Segment X short, rounded, bearing pair of anterolateral papillae. Bursa copulatrix with pair of anterior lobes and narrow posterior extension.

*Holotype*. Male. Costa Rica: Puntarenas: Río Guineal, ca. 1 km (air) E Finca Helechales, 9.076°N, 83.092°W, el. 840 m, 22.ii.1986, Holzenthal, Morse, Fasth (NMNH).

*Paratypes*. COSTA RICA: Limón: Río Telire and small trib., SE Suretka, 9.554°N, 82.892°W, el. 48 m, 1.ii.1986, Holzenthal, Morse, Fasth, 1 male (UMSP); Puntarenas: same as holotype, 1 male (NMNH); Puntarenas: Río Singrí, ca. 2 km (air) S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii.1986, Holzenthal, Morse, Fasth, 1 male (INBIO); San José: Río General, ca. 1 km S San Isidro, 1.vii.1967, P. J. Spangler, 16 males, 7 females (NMNH); San José: Río General, Pacuare, 1.vii.1967, Flint and Ortiz, 4 males (NMNH); ECUADOR: Pastaza: Puyo (27 km N) Estacion Fluvio-metrica, 4.ii.1976, P. Spangler et al., 1 male (NMNH).

Etymology: Latin, without lobes, referring to a distinguishing character of both the male and female genitalia.

#### DISTRIBUTION RECORDS FOR *MAYATRICHIA* IN COSTA RICA

##### Fig. 5

*Mayatrachia ayama* Mosely 1937:182, fig. 30, male, Mexico: Guerrero (BMNH); Ross 1944:160, 279, figs. 557–560, 929; Bueno-Soria and Flint 1978:202; Blickle 1979: 56, fig. 11.

*Records*. ALAJUELA: Río Pizote, ca. 5 km N Dos Ríos, 10.948°N, 85.291°W, el. 470 m, 9.iii.1986, Holzenthal and Fasth, 79 males; Río Pizote, ca. 5 km (air) S Brasilia, 10.972°N, 85.345°W, el. 390 m, 12.iii.1986, Holzenthal and Fasth, 291 males. GUANACASTE: 10 mi NW Liberia, Río Ahogados, 25.vii.1965, P. J. Spangler, 22 males, 24 females (NMNH); Las Cañas, Río Corobici, 26.vii.1967, O. S. Flint, Jr., 9 males, 2 females (NMNH); Quebrada Garcia, 10.6 km ENE Quebrada Grande, 10.862°N, 85.428°W, el. 470 m, 8.iii.1986, Holzenthal and Fasth, 2 males; Río Tempisquito, ca. 3 km S route 1, 10.790°N, 85.552°W, el. 75 m, 6.iii.1986, Holzenthal and Fasth, 71 males; Río Tizate, 7.2 km NE Cañas Dulces, 10.773°N, 85.449°W, el. 275 m, 28.vi.1986, Holzenthal, Heyn, Armitage, 18 males; Río Mena, 4.2 km W Santa Cecilia, 11.059°N, 85.448°W, el. 260 m, 11.iii.1986, Holzenthal and Fasth, 1 male; Río Los Ahogados, 11.3 km ENE Quebrada Grande, 10.865°N, 85.423°W, el. 470 m, 7.iii.1986, Holzenthal and Fasth, 1 male. HEREDIA: Est. Biol. La Selva, Río Puerto Viejo, 10.440°N, 84.012°W, el. 30 m, 19.vi.1986, Holzenthal, Heyn, Armitage, 1 male. LIMON: Río Uatsi, ca. 8 km W Bribri, 9.62°N, 82.90°W, el. 60

m, 25.iii.1987, Holzenthal, Hamilton, Heyn, 1 male. PUNTARENAS: Río Ceibo, route 2, ca. 6 km W road to Buenos Aires, 9.149°N, 83.377°W, el. 250 m, 20.ii.1986, Holzenthal, Morse, Fasth, 1 male.

*Distribution.* CANADA (Alberta to Quebec); UNITED STATES (east of western continental divide); MEXICO (Guerrero, San Luis Potosí, Tabasco, Veracruz); HONDURAS; COSTA RICA (Alajuela, Guanacaste, Heredia, Limón, Puntarenas).

*Mayatrachia rualda* Mosely, 1937:183, fig. 31, male, Mexico: Chiapas (BMNH); Buenos-Soria and Flint 1978:202.

*Records.* GUANACASTE: Río Tizate, 7.2 km NE Cañas Dulces, 10.773°N, 85.449°W, el. 275 m, 28.vi.1986, Holzenthal, Heyn, Armitage, 1 male; P.N. Rincón de la Vieja, Quebrada Zopilote, 10.765°N, 85.309°W, el. 785 m, 3.iii.1986, Holzenthal, 1 male. PUNTARENAS: Río Guineal, 1 km (air) E Finca Helechales, 9.076°N, 83.092°W, el. 840 m, 21.iii.1986, Holzenthal, Morse, Fasth, 27 males; same locality, but 4.viii.1987, Holzenthal, Morse, Clausen, 2 males; Río Singrí, ca. 2 km (air) S Finca Helechales, 9.057°N, 83.082°W, el. 720 m, 21.ii.1986, Holzenthal, Morse, Fasth, 74 males.

*Distribution.* MEXICO (Chiapas); COSTA RICA (Guanacaste, Puntarenas).

KEY TO ADULTS OF NEOTROPICAL *MAYATRICHIA*  
(EXCLUSIVE OF *M. ALIENA*)

- 1. Males ..... 2
- Females ..... 4
- 2. Inferior appendage in ventral aspect wide at apex and bearing 5 or 6 setae (Ross, 1944, fig. 929B), in lateral view with prominent basodorsal lobe (Ross, 1944, fig. 929A) . . . . . *M. ayama* Mosely
- Inferior appendage in ventral aspect narrow at apex and bearing 2 setae (Fig. 1C; Mosely, 1937, fig. 31c), in lateral view with basodorsal lobe absent or indistinct ..... 3
- 3. Posterolateral process of abdominal segment IX with prominent ventral lobe on posterior margin (Mosely, 1937, fig. 31a); inferior appendage with basodorsal lobe . . . . . *M. rualda* Mosely
- Posterolateral process of abdominal segment IX without ventral lobe on posterior margin (Fig. 1A); inferior appendage without basodorsal lobe ..... *M. illobia* Harris and Holzenthal
- 4. Bursa copulatrix with ventral lobe, posterior extension elongate (Figs. 2B, 3B); outer sclerotized rods of abdomen longer than inner rods (Figs. 2A, 3A) ..... 5
- Bursa copulatrix lacking ventral lobe, posterior extension short (Fig. 4B); outer sclerotized rods of abdomen shorter or equal in length to inner rods (Fig. 4A) ..... *M. illobia* Harris and Holzenthal
- 5. Bursa copulatrix with posterior extension narrow and over 2x as long as anterior body (Fig. 2B) ..... *M. rualda* Mosely
- Bursa copulatrix with posterior extension triangular, about equal in length to anterior body (Fig. 3B) ..... *M. ayama* Mosely

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